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Forest Statistics

for

Western Maryland

Northeastern Forest Experiment Station

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Forest Service, U.S. Dept. of Agriculture

Forest Statistics Series: Maryland No. 1

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FOREWORD

This is the first of three preliminary reports about forest areas and timber volume in the State of Maryland. It is a product of the forest survey of the Northeast, carried on by the Northeastern Forest Experiment Station as part of the nation-wide forest survey being made by the Forest Service, U. S. Department of Agriculture.

Similar reports are planned for the two other parts of the State: one for the Western Shore and one for the Eastern Shore.

The Maryland Department of State Forests and Parks, Department of Research and Education, and Department of Game and Inland Fish supplied the necessary aerial photographs. The Department of Research and Education also provided half the field personnel and cooperated in many other phases of the survey.

Field work in Western Maryland was supervised by Harry W. Camp, Jr. C. Allen Bickford developed the statistical procedures used in the survey. Computations were made under the supervision of Roland H. Ferguson.

Ralph W. Marquis

Ralph W. Marquis
Director

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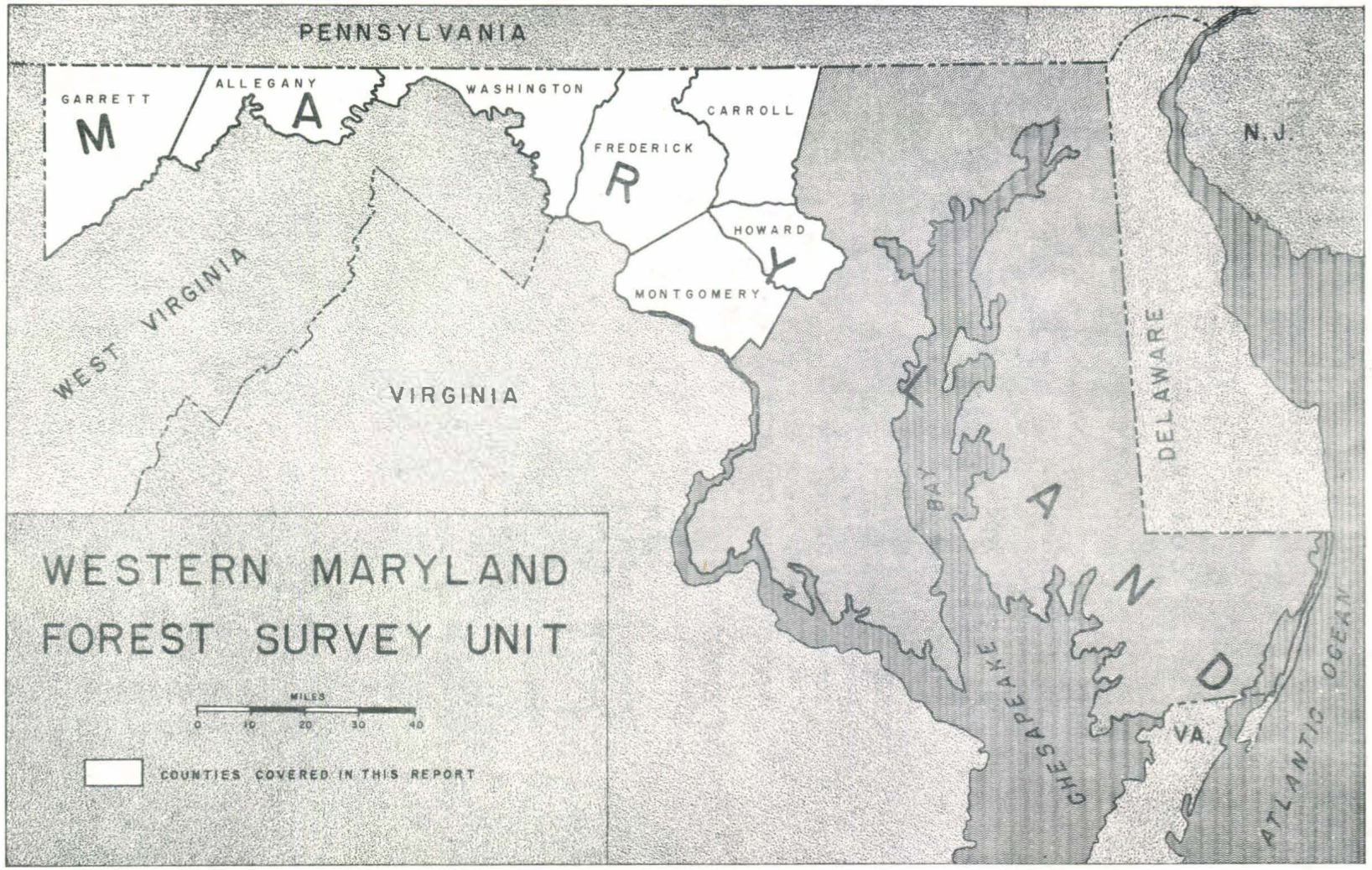
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FOREST STATISTICS FOR WESTERN MARYLAND

by

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Northeastern Forest Experiment Station
Forest Service, U.S. Dept. Agriculture

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GENERAL

Western Maryland includes the seven westernmost counties of the State: Garrett, Allegany, Washington, Frederick, Carroll, Howard, and Montgomery. The area is a pinched arm of land lying between Pennsylvania and the Potomac River.

Three-fourths of the area is drained by the Potomac River. The remainder is drained by the Youghiogheny River and minor streams that flow into Chesapeake Bay.

The area is almost equally divided between two distinct physiographic regions, the Piedmont Plateau in the east and the Appalachian Mountains in the west.

The Piedmont Plateau is a gently rolling upland; it contains some of the State's best farm land. In contrast,

the Appalachian Mountains are a series of gigantic wrinkles --long, straight ridges separated by narrow valleys. In the extreme western part of the Appalachian Mountain region the topography levels off somewhat to a rolling highland. This section is mostly forested, except for the fertile bottomlands.

The topography has greatly influenced the forests that occur in each of these regions. To emphasize the unbalanced distribution of forest land between the two regions, some of the forest statistics have been presented separately for each.

The Forest Area

Western Maryland has a total land area of slightly more than 2 million acres. Almost 1 million acres are forested.

Commercial forest land amounts to 914,000 acres.

About 16,000 acres of forest land are reserved from commercial timber cutting. Most of this reserved forest land is in the Catoctin Recreational Demonstration Area and the Chesapeake and Ohio Canal Park.

The two westernmost counties (Allegany and Garrett) are the most heavily forested. Two-thirds of the land in these counties is covered with forest. The two counties contain about half the forest land in Western Maryland.

Ownership

Farmers own more than one-third of the commercial forest land. Other private owners hold a little less than half. The remaining 13 percent is publicly owned. Most of this is owned by the State; it is administered by the Department of Forests and Parks. There is also some municipal forest land in the district--notably forests owned by Baltimore, Frederick, Thurmont, Emmitsburg, and Hagerstown.

The Forest Types

In distribution of major forest types there is no marked difference between the two physiographic regions.

Oak types occupy three-fourths of the commercial forest land. Red oak is the most extensive single type; it covers 45 percent of the forest land and may be found on any site. The less extensive white oak type prefers the better sites on the lower slopes. Chestnut oak is usually found on high, dry, rocky hills and ridges.

After the oaks the next most prevalent type is sugar maple-beech. This type occurs almost exclusively along the streams in the high plateau country in Allegany and Garrett Counties. The yellow-poplar type is found on moist sites in the lower valleys to the east. Bottomland hardwoods occur mostly in the Piedmont Plateau on the flood plains of the larger streams. River birch-sycamore grows along the smaller streams in the Piedmont; river birch is a minor component here.

Softwood types consist mostly of the hard pines--Virginia pine and pitch pine. These usually occur at high elevations on sites similar to those occupied by chestnut oak and the poorer red oaks.

Condition Of The Forests

More than one-third of the sawlog volume occurs on less than 8 percent of the commercial forest area. This is the area that bears stands of more than 5,000 board feet per acre.

Saw-timber stands of 1,500 to 5,000 board feet per acre occupy one-fourth of the forest area.

Pole-timber stands occupy more than 40 percent of the commercial forest land.

The remaining one-fourth of the forest area is covered with stands in which trees of sapling size and smaller predominate. This includes 70,000 acres of forest land less than 10 percent stocked.

Although the Piedmont Plateau region contains little more than one-fourth of the forest land, it has nearly half of the heavier saw timber, that is, sawlog volume in stands of more than 5,000 board feet per acre. This is because most of the forest land in the Piedmont is in small patches owned by farmers. These stands are cut lightly; many of them are carefully preserved for sentimental or aesthetic

reasons. The forests in the Appalachian Mountains, on the other hand, occur in large blocks; they have been cut heavily for lumber and for mine props and timbers to supply the nearby coal mines.

Timber Volume

There are 1½ billion board feet of live saw timber in Western Maryland (International ¼-inch rule). Thirty percent of this volume is red oak and another 25 percent is white oak and chestnut oak.

Following the oaks in order of abundance are yellow-poplar, hickory, and red maple. Softwood species (chiefly hemlock, hard pines, and white pine) make up 10 percent of the sawlog volume. The rest is distributed among various other hardwoods. The average acre of forest land in Western Maryland contains about 1,700 board feet of saw timber.

The volume of primary growing stock totals 647 million cubic feet. Of this, 329 million cubic feet are in saw-timber trees and 318 million are in pole-timber trees. Three-fourths of the primary growing stock is in trees less than 15 inches in diameter. These smaller trees are the ones most in demand for pulpwood and mine props and timbers.

The cubic volume of primary growing stock is equivalent to some 8 million rough standard cords. More than 90 percent of this volume is hardwood.

Table 1.--Land area in Western Maryland, by major classes of forest land, 1950

Class of land[1]	Physiographic region		Total	
	Appalachian Mountains	Piedmont Plateau		
	Acres	Acres	Acres	Percent
Commercial forest land	663,100	251,100	914,200	42
Reserved forest land[2]	14,600	1,900	16,500	1
All forest land	677,700	253,000	930,700	43
Nonforest land	472,400	786,300	1,258,700	57
All land[3]	1,150,100	1,039,300	2,189,400	100

[1] See Appendix for definitions.

[2] Includes 10,100 acres in the Catoctin Recreational Demonstration Area and 3,100 acres in the Chesapeake and Ohio Canal Park area.

[3] From Areas of the United States, 1940, Bureau of the Census. Water areas of 1 to 40 acres are included here in the estimate of nonforest acreage.

Table 2.--Land area and commercial forest area in Western Maryland, by county, 1950

County	Land area	Commercial forest area	
	Acres	Acres	Percent
Garrett	427,500	281,500	66
Allegany	272,600	197,600	72
Washington	295,700	104,000	35
Frederick	425,000	130,500	31
Carroll	291,800	77,500	27
Howard	160,600	50,200	31
Montgomery	316,200	72,900	23
Total	2,189,400	914,200	42

Table 3.--Commercial forest area in Western Maryland, by ownership, 1950

Ownership class	Acreage held	
	Acres	Percent
Private:		
Farm forest land[1]	347,000	38
Other private	447,500	49
Total private	794,500	87
Public:		
State[2]	102,200	11
Municipal[3]	17,100	2
Federal	400	(4/)
Total public	119,700	13
All ownerships	914,200	100

[1] Census of Agriculture, 1950.

[2] Includes 1,100 acres owned by University of Maryland, 4,400 acres administered by the Department of Fish and Game, and 96,400 acres administered by the Department of Forests and Parks.

[3] Includes 7,500 acres owned by Baltimore and 6,900 acres owned by Frederick.

[4] Less than 0.5 percent.

Table 4.--Commercial forest area in Western Maryland, by forest type, 1950

Forest type	Area	
	Acres	Percent
Softwood types	47,100	5
Red oak	408,200	45
White oak	186,600	20
Other oak types	104,300	11
Sugar maple-beech	80,800	9
Yellow-poplar	25,900	3
Bottomland hardwood and river birch-sycamore	61,300	7
All types	914,200	100

Table 5.--Commercial forest area in Western Maryland, by stand-size class and forest-type group, 1950

Forest-type group	Saw-timber stands	Pole-timber stands	Seedling, sapling, and other stands	Total
	Acres	Acres	Acres	Acres
Softwood types	15,900	24,400	6,800	47,100
Oak types	236,200	291,800	171,100	699,100
Other hardwood types	42,100	67,800	58,100	168,000
All types	294,200	384,000	236,000	914,200
Percent	32	42	26	100

Table 6.--Commercial forest area in Western Maryland, by stand-size class and watershed, 1950

Stand-size class	Watershed			Total
	Potomac River	Upper Chesapeake Bay[1]	Youghiogheny River	
	Acres	Acres	Acres	Acres
Saw-timber stands:				
More than 5,000 bd.ft. per acre	41,200	22,300	5,800	69,300
1,500-5,000 bd.ft. per acre	184,100	11,600	29,200	224,900
Pole timber stands	289,800	12,800	81,400	384,000
Seedling and sapling stands	109,700	30,500	26,000	166,200
Other stands	47,500	9,800	12,500	69,800
All stands	672,300	87,000	154,900	914,200
Percent	73	10	17	100

[1] Includes 6,100 acres of the Lower Susquehanna River watershed.

Table 7.--Volume of live timber on commercial forest land in Western Maryland, by species, 1950

Species	Primary growing stock		Saw timber[1]
	Thousand cu.ft.	Equivalent in cords	Thousand bd.ft.
Hemlock	12,100	151,200	45,000
Hard pines	28,700	358,800	40,100
White pine	9,100	113,700	34,400
Other softwood	7,100	88,800	29,600
All softwood	57,000	712,500	149,100
Red oak	164,300	2,053,700	453,600
White oak	75,000	937,500	219,300
Yellow-poplar	47,400	592,500	165,600
Chestnut oak	86,300	1,078,800	160,900
Hickory	43,200	540,000	100,400
Red maple	52,500	656,200	83,000
Beech	8,600	107,500	29,600
Sugar maple	17,900	223,800	25,100
Black locust	19,000	237,500	22,400
Black walnut	6,200	77,500	15,100
Black cherry	8,600	107,500	13,000
Other hardwood[2]	61,100	763,800	79,600
All hardwood[3]	590,100	7,376,300	1,367,600
All species[4]	647,100	8,088,800	1,516,700

[1] Log scale, International $\frac{1}{4}$-inch rule.

[2] Includes 7,800,000 cubic feet or 120,000 cords of so-called noncommercial species such as hophornbeam and sassafras. The board-foot volume in such species is negligible.

[3] In addition there are 14,000,000 cubic feet (215,000 cords) of dead chestnut, including 34,200,000 board feet in saw-timber trees.

[4] In addition there are 66,700,000 cubic feet of sound material in live cull trees and 12,800,000 cubic feet of sound material in the cull portions of trees comprising the primary growing stock. Some of this material may be utilized locally for low-grade uses such as crating, dunnage, and miscellaneous construction.

Table 8.--Volume of live timber on commercial forest land in Western Maryland, by diameter class, 1950

Diameter class[1] (inches at breast height)	Primary growing stock	Saw timber
	Thousand cu.ft.	Thousand bd.ft.
Softwood:		
6	8,800	--
8	12,700	--
10	7,200	23,600
12	6,900	27,200
14	6,800	28,600
16	5,800	26,300
18	5,600	27,100
20 and more	3,200	16,300
All softwood	57,000	149,100
Hardwood:		
6	79,600	--
8	105,800	--
10	111,700	--
12	75,100	295,200
14	74,700	333,000
16	47,400	229,100
18	31,200	158,100
20	25,900	137,300
22	15,200	82,800
24	10,700	62,000
26 and more	12,800	70,100
All hardwood	590,100	1,367,600
Total	647,100	1,516,700

[1] Each class includes all trees falling within the range from 1.0 inches less than to 0.9 inches more than the indicated diameter; thus the 6-inch class includes diameters in the range 5.0 to 6.9 inches inclusive.

Table 9.--Average net volume per acre of live timber on commercial forest land in Western Maryland, by stand-size class, 1950

Stand-size class (and acreage of each class)	Primary growing stock	Saw timber
	Cubic feet	Board feet
Saw-timber stands:		
More than 5,000 bd.ft. per acre (69,300 acres)	1,860	7,750
1,500-5,000 bd.ft. per acre (224,900 acres)	1,160	3,140
Pole-timber stands:		
More than 600 cu.ft. per acre (201,700 acres)	760	870
200-600 cu.ft. per acre (182,300 acres)	440	450
Other stands (236,000 acres)	100	70
Average, all stands[1] (914,200 acres)	710	1,660

[1] Hardwood constitutes 90 percent of the total board-foot volume, or 91 percent of the total cubic-foot volume, in the average stand.

Table 10.--Volume of live timber on commercial forest land in Western Maryland, by physiographic region and forest-type group, 1950

APPALACHIAN MOUNTAINS

Forest type	Primary growing stock	Saw timber
	Thousand cu.ft.	Thousand bd.ft.
Oak types	337,200	719,000
Other types	126,500	257,000
All types	463,700	976,000
PIEDMONT PLATEAU		
Oak types	153,200	467,500
Other types	30,200	73,200
All types	183,400	540,700

APPENDIX

DEFINITIONS OF TERMS

Forest Land

Forest land.--Includes (a) lands that are at least 10 percent stocked by trees of any size and capable of producing timber or other wood products, or of exerting influence on the climate or on the water regime; (b) land from which the trees described in (a) have been removed to less than 10 percent stocking and which have not been developed for other use; and (c) afforested areas. Forest tracts of less than 1 acre and isolated strips of timber less than 120 feet wide are excluded.

Commercial forest land.--Forest land that is (a) producing, or physically capable of producing, usable crops of wood (usually saw timber), (b) economically available now or prospectively, and (c) not withdrawn from timber utilization.

Reserved forest land.--Forest land that has been withdrawn from timber utilization through statute, ordinance, or administrative order.

Forest Types

Forest types are defined according to the species, or species groups, that make up the major portion of the stand in terms of board feet in saw-timber stands or number of stems in other stands.

Softwood types.--Chiefly hard pine types made up mostly of pitch pine and Virginia pine. Oak often occurs as a minor component in these types. Other softwood types include the hemlock, spruce, and white pine types.

Hardwood types.--The names of these types are generally self-explanatory. The bottomland hardwood type consists mostly of black gum, white oak, red maple, elm, and ash.

Stand-Size Classes

Saw-timber stand.--A stand with saw-timber trees that has a minimum net volume per acre of 1,500 board feet (International $\frac{1}{4}$-inch rule).

Pole-timber stand.--A stand that fails to meet the saw-timber stand specification, but is at least 10 percent stocked with pole-timber and larger trees, with 200 or more cubic feet of primary growing stock per acre, and with at least half this minimum volume in pole-timber trees.

Seedling and sapling stand.--A forest stand that does not qualify as either saw-timber or pole-timber stand but has at least 10 percent stocking of trees, with at least half the minimum stocking in saplings and seedlings.

Other stands.--Forest stands that do not qualify as saw-timber, pole-timber, or seedling and sapling stands; nonstocked areas.

Tree Classes

Saw-timber trees.--Trees that contain (1) a butt sawlog or (2) upper sawlog net volume that amounts to 50 percent or more of the gross volume in the main stem between stump height (1 foot) and top of the uppermost sawlog. Softwood saw-timber trees are at least 9.0 inches in diameter at breast height (d.b.h.); hardwood saw-timber trees are at least 11.0 inches d.b.h.

(Sawlogs are defined as follows: Softwood sawlogs are at least 6.0 inches in diameter, inside bark at small end; 8 to 16 feet in length; sound and straight enough to be manufactured into commercial lumber; and for the smaller logs, generally free of surface defects other than small tight knots. Hardwood sawlogs are at least 8.0 inches in diameter, inside bark at small end; 8 to 16 feet in length; suitable for sawing into commercial factory lumber, construction materials or ties.)

Pole-timber trees.--Trees 5.0 inches d.b.h. or larger that do not meet the specifications for saw-timber trees now, but are straight and clear enough to become saw-timber trees in the future.

Seedling and sapling trees.--Trees smaller than 5.0 inches d.b.h. that appear to be well established.

Cull trees.--Trees 5.0 inches d.b.h. and larger that do not meet the specifications for saw-timber trees or pole-timber trees.

Timber Volume

Primary growing stock.--Net volume, in cubic feet, of live saw-timber trees and live pole-timber trees from stump to a minimum 4.0-inch top (of central stem) inside bark.

This volume is also given in rough standard cords (bark included). Cord volume is derived from cubic-foot volume by applying a factor of 80 cubic feet per cord.

Saw-timber volume.--Net volume, in board feet (International ¼-inch rule), of sawlogs in saw-timber trees of all species.

FOREST SURVEY METHODS

These forest statistics for Western Maryland are based on information gathered from sample plots. These plots are distributed randomly over the entire area.

They were first located on aerial photographs. Trained photo interpreters then examined the photos and classified each forest plot according to stand size. Field crews inspected enough plots on the ground to attain a specified level of statistical accuracy. Species and volume data were collected on these ground plots.

The survey was designed for maximum accuracy in the estimate of total merchantable cubic volume.

ACCURACY OF THE ESTIMATES

The estimates in this report may contain two kinds of error. First, photo-interpreters may make mistakes of judg-

ment and fieldmen may make mistakes in measuring or recording. There is no practical way of finding out just how often such errors occur. But they are kept to a minimum by closely checking all phases of the work.

The second kind of error is associated with sampling procedures. The size of this error can be measured. In Western Maryland the chances are 2 to 1 that the error will not exceed 3.7 percent of the total forest area, 6.8 percent of the total board-foot volume, or 5.2 percent of the total cubic-foot volume.

These percentages show that the area estimates are more accurate than the volume estimates, and that cubic-foot estimates are more accurate than board-foot estimates.

In each of the tables, the total figures are more accurate than the subtotals. The subtotals are more accurate than any of the individual figures. Figures that are small in relation to totals are subject to larger sampling errors.

SPECIES TALLIED

The various tree species tallied in Western Maryland are listed below.[1] Approved common names are shown in parentheses if these differ from the brief name used in the tables.

Softwoods

Hemlock (Eastern hemlock)	- Tsuga canadensis
White pine (Eastern white pine)	- Pinus strobus
Hard pines (Pitch pine)	- Pinus rigida
(Table mountain pine)	- Pinus pungens
(Virginia pine)	- Pinus virginiana
Other softwoods (Red spruce)	- Picea rubens
(Eastern redcedar)	- Juniperus virginiana

Hardwoods

Sugar maple	- Acer saccharophorum
Red maple (Red maple)	- Acer rubrum
(Silver maple)	- Acer saccharinum
Red oak (Northern red oak)	- Quercus borealis
(Black oak)	- Quercus velutina
(Scarlet oak)	- Quercus coccinea
(Pin oak)	- Quercus palustris
(Water oak)	- Quercus nigra
(Shingle oak)	- Quercus imbricaria
White oak (White oak)	- Quercus alba
(Bur oak)	- Quercus macrocarpa
Chestnut oak	- Quercus montana
Beech (American beech)	- Fagus grandifolia
Black cherry	- Prunus serotina
Yellow-poplar	- Liriodendron tulipifera
Hickory	- Carya species
Black walnut	- Juglans nigra
Black locust	- Robinia pseudoacacia
Other hardwoods (Yellow birch)	- Betula lutea
(Sweet birch)	- Betula lenta

[1] U.S. FOREST SERVICE. CHECK LIST OF THE NATIVE AND NATURALIZED TREES OF THE UNITED STATES INCLUDING ALASKA. U.S. FOREST SERVICE. 325 PP. 1949.

(River birch)	- *Betula nigra*
(Ash)	- *Fraxinus* species
(American basswood)	- *Tilia americana*
(Elm)	- *Ulmus* species
(Aspen)	- *Populus* species
(Blackgum)	- *Nyssa sylvatica*
(Butternut)	- *Juglans cinerea*
(Sycamore)	- *Platanus occidentalis*
(Black willow)	- *Salix nigra*
(Hackberry)	- *Celtis occidentalis*
(Flowering dogwood)	- *Cornus florida*
(Cucumbertree)	- *Magnolia acuminata*
(Eastern hophornbeam)	- *Ostrya virginiana*
(Pin cherry)	- *Prunus pensylvanica*
(Sassafras)	- *Sassafras albidum*
(Ailanthus)	- *Ailanthus altissima*

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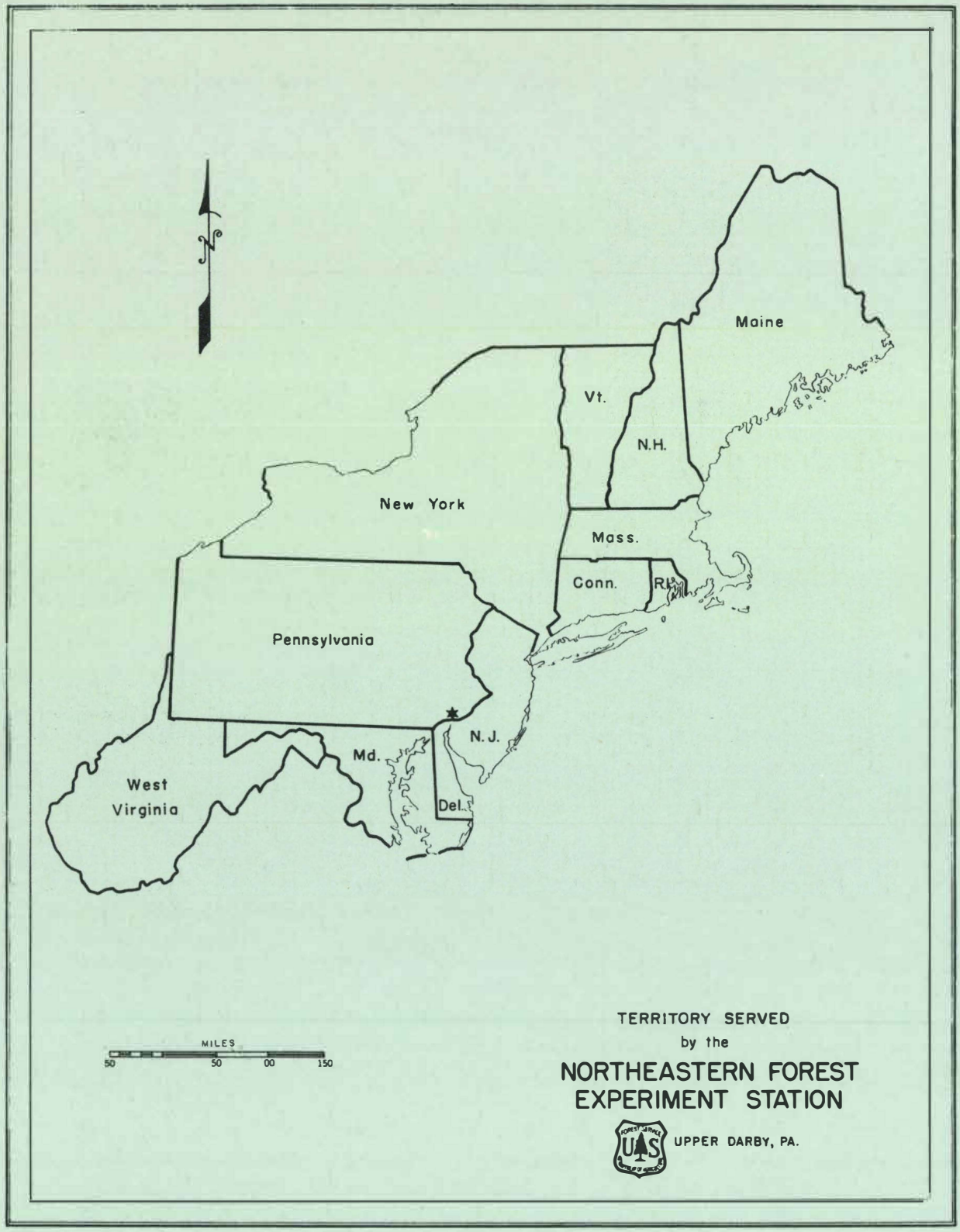
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